

Ecologically Effective Contaminants Adsorption

Sorbster® Media Column Studies for Removal of Metals from A Foundry's **Cooling Process Water**

Introduction

Foundry Cooling Process water containing a variety of metals @ pH 7.15 was sampled to Sorbster for investigation of chemi-adsorption removal by Sorbster® media. The sample was visibly turbid with 29 ppm suspended solids and a 5.0 micron filtration step was done prior to flow through the column of Sorbster. Metals of concern were beryllium, cadmium, chromium, lead, molybdenum, nickel and zinc. All of these metals were reduced by Sorbster® media treatment, with chromium and cadmium being completely removed from the water.

Test Method

3000 milliliters (12 bed volumes) of filtered foundry cooling water was pumped up flow @ 12.34 ml/minute through a backwashed 227.5 gram packed bed of commercial Sorbster media pellets (lot PM-062711-1-P). This flow provided a water-to-media contact time of 21.2 minutes. The inlet water and composite samples at each 1000 ml of column effluent were analyzed for metals by Precision Analytical, Inc., Cleveland, OH (EPA method 200.7.)

Sorbster Results

Treatment of filtered water through a column of Sorbster® media removed all of the chromium and cadmium and significantly reduced lead, molybdenum, nickel and zinc. Beryllium was not present in the water as received. 5.0 micron filtration removed 0.4 ppb insoluble selenium to non- detected for column testing.

| Metal | Inlet to Column | Treated Outlet @ Liter 1, ppb | Treated Outlet @ Liter 2, ppb | Treated Outlet @ Liter 3, ppb | % Removed @ Liter 3 (11.5 Bed Volumes) |
|------------|--------------------|----------------------------------|----------------------------------|----------------------------------|---|
| Cadmium | 2.6 | Not detected | Not detected | Not detected | >95% |
| Chromium | 2.6 | Not detected | Not detected | Not detected | >95% |
| Lead | 10.8 | 2.8 | 3.7 | 4.9 | 55% |
| Molybdenum | 7.9 | 2.1 | 1.9 | 1.9 | 76% |
| Nickel | 31.2 | 19.5 | 23.2 | 24.4 | 22% |
| Zinc | 127 | 159 | 113 | 108 | 15% |

Recommendation

Four to six week on-site demonstration of Sorbster® media for metals removal using a 2 gpm field demo unit (four vessels containing 200 lbs. total) is the recommended next step. A field demo accomplishes optimization of contact time and provides an indication of long-term media capacity.